

Commercial Real Estate in the Digital Economy

by Robert (Bim) Krumhansl and Alex Zikakis

Introduction

Distance is dead. On September 7, 2001 Professor Jacques Marescaux, M.D. of the European Institute of Telesurgery and Dr. Michel Gagner performed the first transatlantic telesurgery from a downtown New York office building on a woman in France using remote-controlled surgical arms. The surgery was made possible by high-speed fiber optic connections and advanced robotics that reduced a distance of 4,000 miles to less than 200 milliseconds. Specialized surgeons now routinely perform remote surgeries at hospitals around the world.

Author

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Lord Harold Samuel, the late British real estate tycoon who coined the expression 'location, location, location' would take notice. Artificial intelligence and broadband connectivity are deeply disrupting established industries, and the real estate industry is no exception. Some locations struggle from high unemployment, declining populations, and stagnant economies while others are experiencing unprecedented growth. A new era of digital automation and globalization is poised to rapidly displace workers and transform the economy. Many commercial assets that were once considered rock solid investments may suffer. This article discusses how digital technologies are impacting commercial real estate, and which assets are best positioned for long term value growth in our rapidly changing world.

A Brief History of Disruptive Technologies and Real Estate

The story of John Henry was popularized in the late 1800's when the push to expand railroads across the United States required teams of men to clear ground and lay railroad tracks into the western frontier. Legend tells that when one railroad owner sought to replace his steel driving crew with a steam-powered hammer, John Henry challenged the new machine to a race. Henry won the race but later died from overexertion. Steam power was the most important disruptive technology of its day and it quickly automated work that had required raw physical strength. Its impact resonated across virtually every task, job and industry. Real estate was no exception - steam powered manufacturing and railroads opened new markets for real estate development.

Throughout history, disruptive technologies such as steam power have fueled major shifts in the United States' economy. Their impact has not always been entirely positive in the short term. For example, technological advances and automation played a major role in one of the biggest economic collapses in U.S. history - the Great Depression. In 1910 33% of the U.S. population was employed in agriculture¹. Advances in agricultural science, coupled with the automation of agricultural jobs led to rapid growth in agricultural productivity that simultaneously displaced workers and flooded the market with cheaper food. When prices fell to levels that couldn't sustain family farms and then a severe drought occurred in 1933, the economy collapsed. Land values plummeted and banks failed, as farm loans had constituted a major part of their loan portfolios.

¹ "Occupational Changes During The 20th Century" Ian D. Wyatt and Daniel E. Hecker. United States Bureau of Labor Statistics. Monthly Labor Review March 2006

The U.S. economy recovered once agricultural production was consolidated and displaced workers found training and new manufacturing jobs during World War II. By 1950, only 12% of the labor force was employed in agriculture, and today that number is less than 2%. During the latter half of the 20th century, U.S. manufacturing suffered a similar fate. In 1950, nearly 31% of nonfarm workers were employed in manufacturing². Advances in robotics led to rapid advances in productivity that displaced workers and drove prices down. Global competition then caused many remaining U.S. manufacturing jobs to move abroad. Today, the U.S. manufacturing employment share has decreased to less than 10%. Real estate markets that were once booming manufacturing centers have become “rust belt cities” with depressed land values and persistently high unemployment.

Computers are today’s disruptive technology. They are automating many tasks that previously required human intelligence³. This is deeply impacting the economy, and has been contributing to significant demographic changes over the past twenty years. In a recent working paper prepared for the National Bureau of Economic Research, David Autor attributes the polarization of U.S. labor from 1980 onward to the computerization of routine tasks⁴. Occupations such as bookkeeping and clerical work are more easily automated because they follow precise, repetitive procedures. Jobs in the middle of the labor market’s education and wage distribution are most intensive in these types of tasks, and have experienced significant decline in employment share since 1980. During the same period, non-routine jobs that have proven difficult to automate at the low and high ends of the labor market’s education and wage distribution have experienced significant growth. Low skill, non-routine service occupations such as food preparation, cleaning, gardening, health support, child care, and personal appearance are difficult to automate because they demand adaptation to constantly changing environments and/or require personal interaction. Similarly, employment share for high skill non-routine occupations such as professional services, research, technology development, and management have also experienced significant growth during the same period. These professions utilize abstract creative problem solving and interpersonal relationship building tasks that have been more difficult to automate.

The Value of Location in a Digital Economy

Contrary to many predictions, it is clear that the digital economy has made location increasingly relevant. Rather than dispersing, people and businesses are concentrating in particular cities. These cities tend to have three key advantages that make them competitive for jobs that are not easily automated or sent to lower cost locations. Firstly, these cities were the first locations connected to high speed fiber optic networks and continue to drastically outpace other locations in broadband infrastructure development. This enables them to better attract and retain businesses. Secondly, these cities have universities and other educational and research institutions that collect talent from around the world and foster research and entrepreneurship. This supports the development of startup companies taking advantage of new market opportunities. Finally, these cities offer amenities that support a superior quality of life for their residents. This prevents highly mobile talent from leaving for a better life elsewhere.

Certain cities consistently outperform others in four Top 20 Rankings published by Forbes, The Milken Institute, and Sperling’s Best Places regarding these key attributes (See Figure 1):

² Is U.S. Manufacturing Disappearing? William Strauss. Federal Reserve Bank of Chicago. August 19, 2010

³ *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy.* By Erik Brynjolfsson and Andrew McAfee. Digital Frontier Press Lexington, MA. 2011

⁴ “The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market”. David Autor. National Bureau of Economic Research Working Papers Series, 2009.

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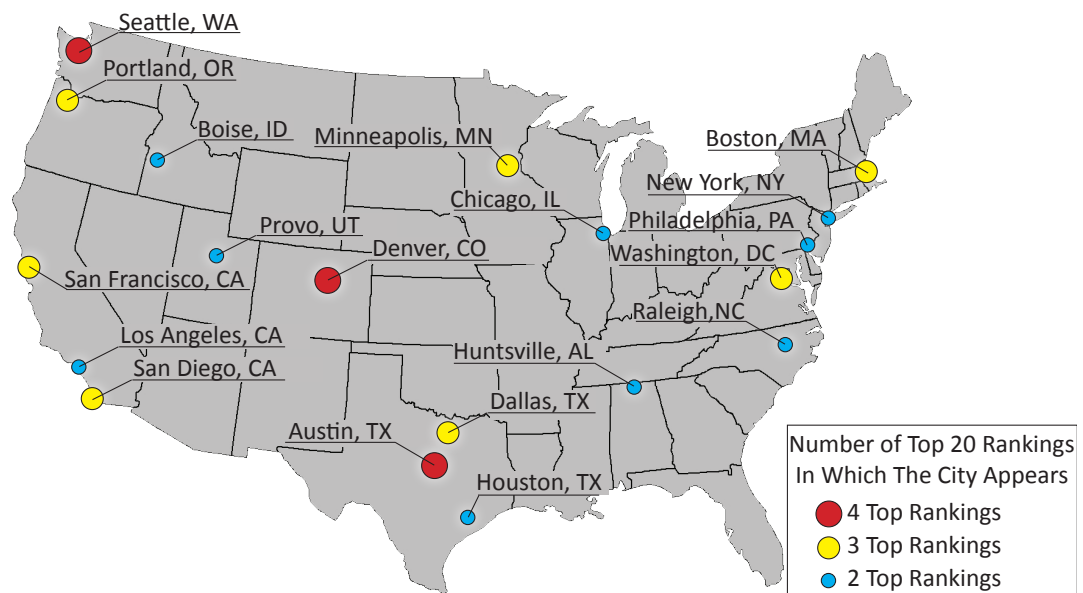
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1. The Forbes *Most Innovative Cities* ranking uses data from the U.S. Patent and Trademark Office regarding the number of patents per capita. This data is combined with venture capital investment per capita from the National Venture Capital Association, along with those cities' ratios of high-tech, science and creative jobs from ZoomProspector.com and Payscale.com.
2. Forbes ranking of *Best Places for Business and Careers* considers twelve metrics relating to job growth (past and projected), costs (business and living), income growth, educational attainment and projected economic growth. They also factor in quality of life issues like low crime rates, cultural and recreational opportunities and net migration patterns. Lastly they include the number of highly ranked colleges in the area.
3. The Milken *Tech Pole* ranks the concentration of high tech businesses as reflected in a city's location quotient adjusted based on percentage of national employment share and wages.
4. The Sperling *Cities on the Edge* rankings assess each city's job market, housing cost and appreciation, population, percentage of young people, education level, income, investment in green living, independent homegrown music scene, artists per 100,000 population, presence of local art institutions, and number of hometown professional sports heroes.

Figure 1

Top Ranked U.S. Cities in the Digital Economy



These rankings indicate geographical regions best poised to attract and retain businesses and residents. This will drive growing demand for many real estate assets in these cities. In fact, a 2009 study confirmed that clusters of high-technology industries (as indicated by Milken Tech Pole rankings) impact performance of residential assets and should be considered in devising a housing portfolio diversification strategy⁵. The study utilized data from 1981 through 2005 and found that optimal frontiers were superior for a mixed housing portfolio with high tech diversification. The highest return portfolio reduced risk by more than 50% in utilizing the high tech diversification strategy as opposed to a pure geography based strategy.

Nationwide, there are indications that most commercial assets will be impacted by developing digital technologies. For example, airport linked industrial assets are

⁵ "Housing Portfolio Risk Reduction through High-Tech Industry Diversification" Wenshang Kang. Journal of Real Estate Portfolio Management. Vol. 15.No. 2 2009.

experiencing growing demand due to the rapid adoption of digital platforms to manage global just-in-time supply chains and next day retail deliveries⁶. However, office and retail assets are likely to be most deeply impacted.

U.S. Office Assets in the Digital Economy

There are many indications that digital technologies are now poised to rapidly displace white-collar office workers in the U.S.. Businesses across nearly every industry are investing in software and computer equipment to boost productivity and drive down labor costs. A recent New York Times article written by John Markoff describes how law firms are replacing lawyers and paralegals with “e-discovery” software that more accurately and efficiently analyzes documents using complex language and fact pattern recognition algorithms⁷. IBM’s ‘Watson’ computer, which was originally developed to compete in Jeopardy!, is now being employed by Citigroup to process and analyze vast amounts of financial data⁸. This will inevitably reduce the firm’s need for financial analysts.

These stories are only the beginning of what will surely become a long-term trend. According to the U.S. Commerce Department, business spending on employees in the past few years has grown by only 2%, while equipment and software expenditures swelled by 26%.⁹ Furthermore, tax incentives for capital investments and decreasing equipment costs have made investment in technology very appealing when compared to rising employee healthcare benefit costs. Consequently, many companies are boosting profits by hiring fewer employees and curtailing expansion into new office space.

Many U.S. office jobs that aren’t automated will move offshore in the coming decades due to an increasingly educated global workforce and globalized workflows utilizing the Internet. In a study published by World Economies, Alan Blinder estimated that between 28.9 million (22%) and 37.8 million (29%) of jobs in the U.S. are offshorable given current technologies¹⁰. In particular, he considered whether the work could be performed electronically over long distances (via the Internet or telephone). Rather than classifying entire industries, he considered the work activities of each particular job. Occupations were broadly sorted into quartiles based on whether:

1. a person in the occupation needs to be physically close to a specific work location;
2. they must be physically close to a work unit; and
3. the work unit must be in a U.S. location.

His study ranked 817 U.S. occupations individually in terms of their offshorability. Highly offshorable jobs (ranked in the top quartile) included: computer programmers, data entry keyers, reservation and transportation ticket agents, office clerks, computer systems analysts, typists, editors, writers, medical transcriptionists, health information technicians, insurance underwriters, bookkeeping clerks, and financial analysts. Not all of these jobs will be sent offshore of course, but many of them could be assumed by workers outside of the U.S. within the next few decades. Offshoring office jobs not only reduces labor and real estate costs, but also enables companies to provide superior 24/7 service and reduce product development time by utilizing ‘follow-the-sun’ workflows. For all of these reasons, U.S. white-collar workers and office assets will experience significant competition from offshore markets in the 21st century.

Another way in which businesses are curtailing expansion into new office space is

⁶ “Logistics & The Rise of Aerotropolis” John D. Kasarda. Real Estate Issues Winter 2000/2001

⁷ “Armies of Expensive Lawyers, Replaced by Cheaper Software” The New York Times. March 4, 2011.

⁸ “IBM Watson Computer To Work At Citigroup” Bonnie Kavoussi. Huffington Post 3/6/2012.

⁹ “Companies Spend on Equipment, Not Workers” Catherine Rampell. The New York Times. June 9, 2011

¹⁰ Blinder, Alan S. “How many US Jobs Might be Offshorable?” World Economies Vol. 10 No.2. April-June 2009. p. 41-78.

through the establishment of telework programs. Many of the fastest growing technology employers are adopting extensive teleworker programs. For example, 40% of IBM's 368,000 employees telework and do not have a traditional office space¹¹. Businesses across the U.S. are only just starting to take advantage of telecommuting to improve their bottom lines. The Telework Research Network's *Telework Savings Calculator* has drawn upon case studies, research papers, books, interviews and surveys to show that half-time telework could save employers over \$10,000 per employee per year. This is primarily due to increased productivity, lower absenteeism (due to sickness or appointment conflicts), improved employee attraction and retention rates, and importantly- *reduced real estate costs*¹².

Nationwide, half-time telework could save \$23 billion per year in imported oil, prevent over 95,000 traffic accidents, save over \$11 billion in accident costs, and lower highway maintenance costs by almost \$2 billion per year¹³. Many state and local governments are already offering telework incentive programs. The Telework Research Network estimates that 45% of the U.S. workforce holds a job that is compatible with at least part-time telework. WorldatWork reported in 2011 that approximately 26 million U.S. workers (20%) teleworked part-time in 2010¹⁴. According to their research, "the typical telecommuter is a 49-year old college educated, salaried, non-union employee in a management or professional role, earning \$58,000 a year at a company with more than 100 employees." These professionals are not self-employed, and would otherwise be working in an office. Nationwide, the work-at-home population is growing twelve times faster than the general population. Markets currently experiencing the most rapid growth in work-at-home teleworkers (over 10 times faster than workforce growth) are: Riverside, California; Tampa Bay, Florida; Salinas, California; Chicago, Illinois; San Jose, California; and Portland, Oregon.

The combined impact of automation, offshoring, and telework programs are all likely to reduce overall demand for office space in the U.S. for the foreseeable future. However, some assets will perform well despite overall declines. In 2010, the Federal Communications Commission unveiled the national broadband plan, describing broadband as "the next great infrastructure challenge of the early 21st century"¹⁵. They consider broadband infrastructure just as critical to U.S. economic progress as railroads were in the late 1800s, electricity was in the early 1900s, and highways were in the late 1900s. A study completed in 2010 by the Public Policy Institute of California found that increased broadband availability raised employment growth by 6.4% from 1999 to 2006¹⁶. This growth translated to 40.8% in management of companies and enterprises; 16.7% in utilities; 16.4% in professional, scientific, and technical services; 14.8% in finance and insurance; and 14.1% in administrative and business support services.

Cities across the country are competing for gigabit Internet, and there are already many government incentives in place to promote the development of broadband infrastructure. For example, in 2006 the City of Santa Monica began leasing access to their 10 gigabit per second municipal fiber optic network (one of the fastest in the nation) to businesses and commercial property owners at significantly reduced cost¹⁷. Media production, Internet, gaming, healthcare, and tech startup companies quickly filled on-net buildings. These "lit" properties now have wait lists and command higher rents than some office towers in downtown Los Angeles.

Clearly, Internet infrastructure is fueling economic development in the 21st century. Those locations with faster cost-competitive Internet access are better attracting businesses

¹¹ "Working Outside the Box: A Study of the Growing Momentum in Telework" Janet Caldw. Institute for Electronic Government, IBM Corporation. January 21, 2009

¹² "Workshifting Benefits: The Bottom Line" Telework Research Network. 2010

¹³ "The State of Telework in the U.S. How Individuals, Business, and Government Benefit" Telework Research Center. 2011.

¹⁴ "Telework 2011: A WorldatWork Special Report". 2011

¹⁵ Connecting America: The National Broadband Plan. Federal Communications Commission

¹⁶ "Does Broadband Boost Local Economic Development?" Jeb Kolko. Public Policy Institute of California. January 2010

¹⁷ <http://www.smgov.net/departments/fisd/smcitynet.aspx>

than those locations with less desirable Internet connections. Digital platforms and supporting telecommunications infrastructure enable companies to coordinate vast multinational networks of researchers, product developers, suppliers, distributors, retailers, and servicers to reach a global market. This is the key to business growth in the digital economy. Consequently, office space demand will increasingly be driven by the availability of infrastructure to support companies' technology requirements. Businesses will demand high-speed low-latency broadband access to utilize tools such as video conferencing and interactive 3D or 4D visualization. They will also demand access to low-cost information storage, so proximity to affordable data storage facilities and point-of-presence locations will also become critical for office developments and their tenants. These demands will make backbone fiber network nodes the next generation hubs for office real estate¹⁸. Office assets with access to this technology infrastructure are best poised to perform well in the digital economy.

U.S. Retail Assets in the Digital Economy

Automation has not only been polarizing employment share for the past twenty years, but also income. The greatest gains in employment share have been enjoyed by high skill workers, with modest gains being experienced by lower skill workers and substantially smaller gains being experienced near the median. These demographic shifts are impacting retail assets nationwide. Given this polarization of income, it isn't a surprise that both discount and luxury retailers are faring best in today's economy. The Thomson Reuters Quarterly SSS index, which tracks same-store sales reports, indicated that the highest gains during the holiday season were experienced by discount and luxury retailers¹⁹. Discount retailers registered an 8.2% increase year over year in 4th quarter 2011. Luxury retailers such as Saks reported 10.5% growth. Meanwhile, Sears recently announced plans to close 120 of its underperforming Sears and Kmart stores, and mid-tier department stores overall registered lower-than-expected 2.4% growth²⁰.

In contrast, online retailers have experienced an 18.1% average annual growth rate from 2002 to 2009²¹. Although online sales were only 4.2% of 3rd quarter 2011 total retail sales, online retail has made very significant inroads into particular types of merchandise. The top five online merchandise lines in 2009 were: clothing and clothing accessories (\$19.5 billion); electronics and appliances (\$14.2 billion); computer hardware (\$11 billion); furniture and home furnishings (\$9.9 billion); and drugs, health aids, and beauty aids (\$6 billion). The fastest growing categories were: computer software (19.8% Y/Y); sporting goods (19.2% Y/Y); music and videos (12.8% Y/Y); clothing and clothing accessories (12.3% Y/Y); and electronics and appliances (7.4% Y/Y)²². As online retail cuts into demand for these products, retail assets with tenants specialized in these merchandise lines may face higher risk of tenant default, non-renewal of leases, and slower expansion into new space.

Category killer big box stores such as Barnes & Noble and Best Buy in particular are struggling to survive despite the recent demise of their primary respective competitors, namely: Borders and Circuit City. Best Buy recently announced plans to close big box stores and transition to mobile sales and smaller store formats²³. For many category killer big box retailers, a store's profitability can be jeopardized when 5-10 % of their total floor space (in high-margin categories) becomes unproductive due to online retail. Category killers' focus

¹⁸ *The Digital Economy: Business Organization, Production Processes, and Regional Developments*. Edward J. Malecki and Bruno Moriset. Routledge Taylor & Francis Group. 2008

¹⁹ "Holiday Cheer For Discounters and Luxury Stores" Thomson Reuters Alpha Now Actionable Investment Insight. December 30, 2011.

²⁰ "January 2012 Retail Sales Result- Luxury and Apparel Stores Led The Pack" Thomson Reuters Alpha Now Actionable Investment Insight. February 3, 2012.

²¹ "E-Stats". U.S. Census Bureau Economics and Statistics Administration. 2011

²² "Total and E-commerce Sales by Merchandise Line: 2009 and 2008". U.S. Census Bureau, 2009 Annual Retail Trade Survey.

²³ "Death of Best Buy's Big Box Store? Company Will Shift To New Model, Close 50 Existing Stores" By Abram Brown. Forbes Online. 3/29/2012.

on particular categories of merchandise can then make it difficult for them to reconfigure their store to incorporate new products that are experiencing less competition from online sales. This can lead to unsustainable reductions in sales per square foot²⁴. Newly vacant 80,000 to 120,000 square foot spaces are becoming more and more difficult to release, and the cost to divide and reconfigure these properties is often prohibitive.

Many traditional retailers have started utilizing multi-channel platforms to capture broader demand and compete with pure-play online retailers. Studies have found that large brick-and-mortar retailers that developed an early online presence ('bricks-and-clicks') are benefiting from greater market share and higher net income than purely online retailers or bricks-and-mortar retailers who did not do so²⁵. However it is unclear whether these gains are sufficient for these retailers to compete over the long term with the economic advantages of purely online retailers' higher inventory turns, lower real estate costs, and faster cash conversion cycles. A significant problem facing retail asset owners with bricks-and-clicks tenants is what is known as "the free rider problem". As retailers focus on creating showroom experiences for their customers, shoppers will often browse and then order products online from less expensive sources. In addition to potentially cutting into tenants' profitability, this can also cause a loss in percentage rents due to many purchases not being reported to property owners despite their retailing spaces' role in procuring these sales²⁶.

Studies have revealed that certain types of in-store retailers are likely to maintain significant competitive advantages over online competitors. In general, online retail is seen as less time intensive, relaxing, and easy in comparison with in-store shopping²⁷. In-store shopping is seen as more exciting, entertaining, stimulating, fun, and enjoyable. This is particularly important given that women (who account for 83% of consumer spending)²⁸ and youth prefer shopping experiences that provide fun, excitement, entertainment, and social companionship. Given these advantages, retail centers that provide superior entertainment and social opportunities are likely to perform well in the digital economy.

Grocery stores in particular are also resilient to online competition. First of all, it isn't feasible for retailers to post online photographs or profiles of each individual piece of produce or cut of meat and most consumers prefer handling these items before purchase. Second, many items sold in supermarkets such as meat, lettuce, dairy, and ice-cream require immediate refrigeration. This means that people must be present for delivery, which is inconvenient for those who prefer maintaining a flexible schedule. It also means that they must plan ahead and wait for products rather than pick up what they need just before a meal. Third, many online grocers tout the convenience of recurring lists when, in fact, most grocery shoppers like to try new things and change their purchases based on shifting appetites. Finally, Internet grocers are unable to gain a cost advantage due to the fact that they must maintain local warehouses and a specialized fleet of refrigerated delivery vehicles, as well as pay local sales taxes. This means they can't benefit from the same delivery infrastructure, economies of scale, and exemptions from local sales taxes that other pure-play online retailers enjoy²⁹. For all of these reasons, grocery anchored retail centers are likely to continue performing well for the foreseeable future.

Retail assets in the U.S. are poised to be deeply impacted by the digital economy due to both changing demographic drivers and competition from online retail. Grocery and

²⁴ "Retailing Revolution: Category Killers on the Brink" Rajiv Lal and Jose B Alvarez. Harvard Business School Working Knowledge. October 10, 2011

²⁵ "Performance Implications of Online Entry Timing by Store-Based Retailers: A Longitudinal Investigation". Iryna Pentina, Lou E. Pelton, and Ronald W. Hasty. *Journal of Retailing*. 85 (2, 2009) 177 - 193.

²⁶ "The Effects of Technology on Retail Sales, Commercial Property Values and Percentage Rents" John S. Baen. *Journal of Real Estate Portfolio Management*. Vol. 6 No. 2, 2000.

²⁷ "Images of Online Versus Store Shopping: Have The Attitudes Of Men And Women, Young And Old Really Changed?" Kirsten A. Passyn, Memo Diriker and Robert Settle. *Journal of Business & Economics Research*. January 2011 Volume 9, Number 1

²⁸ "Images of Online Versus Store Shopping: Have The Attitudes Of Men And Women, Young And Old Really Changed?" Kirsten A. Passyn, Memo Diriker and Robert Settle. *Journal of Business & Economics Research*. January 2011 Volume 9, Number 1

²⁹ "10 Reasons Why Online Grocery Shopping Is Failing" Forbes Online. 7/27/2011

discount retail-anchored properties, as well as entertainment/experiential restaurant and luxury retail properties located in affluent areas are likely to be most resilient to these changes. Retail assets adaptable to a shifting retail landscape will also become desirable. For example, 'shop space' and service oriented retail properties in high-traffic locations that allow for a wide variety of tenant uses will be less expensive and easier than big box properties to reconfigure and release as tenant uses change over time.

Conclusion

Distance may be dead, but location is not. Information technology and broadband connectivity are enabling automation and globalization to proceed at an accelerating pace-fuelling innovation, boosting productivity, and opening new markets for American products and services. Though unstable, the U.S. economy is poised to grow due to demographics, leading universities, and an entrepreneurial culture. By 2020, demographically the U.S. will be younger than both China and the Euro Zone. U.S. youth have been raised with digital technology and will easily adapt to the changing economy. More than half of the world's top 100 universities remain in the United States. These universities translate research into innovation and facilitate an entrepreneurial culture of open-mindedness, creativity, risk-taking, and hard work.

Businesses that embrace digital technologies are experiencing growth and productivity that outpace their competition. These businesses are clustering in particular locations, fuelling rapidly growing demand for real estate. New technology ultimately creates new opportunities. However, the recent recession was a wake-up call. The U.S. economy is experiencing sweeping transformation. Workers are being displaced. Capital markets are experiencing upheaval. Political power is shifting. Global competition and digital technologies are at the root of these changes. Displaced U.S. workers will learn, adapt and move to new jobs. Although most real estate assets will not be rendered obsolete overnight, the most successful real estate investors and developers will position to take advantage of the rapidly evolving digital economy.



